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ABSTRACT

The purpose of this essay is to briefly survey from a global point of view theoretical and empirical issues related to the economics of early childhood education and day care. The first section of the essay takes up issues in two broad areas of policy: (1) social efficiency, and (2) opportunity and equity. The first class of issues implies a resource allocation question; the second class of issues addresses the question of private versus social payment for a given service. Costs and benefits related to the provision of early childhood social services (including child benefits and mother's labor force participation benefits) are discussed. The second section reports empirical aspects of issues previously discussed. International comparisons are made of kindergarten or pre-primary education, day care or creche facilities, levels of expenditure, unit cost structures, and public versus private finance arrangements. The third section further explores the social benefits associated with expenditure on children. In the final section, seven priority areas for further research are identified. (Author/RH)

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THE ECONOMICS OF EARLY CHILDHOOD EDUCATION AND DAY CARE

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I. INTRODUCTION

What are the resources used for the welfare of young children in contemporary Western societies? Is the level of expenditure on such activities as crèches and kindergartens socially optimal? What is the concept of optimality in this particular area? What does society get back per unit of expenditure on specific child services provision? How is the total resource expenditure on children financed in different countries?

These are examples of questions one should ask under the heading of the economics of early childhood services. The aim of this essay is to briefly survey these issues from the theoretical and empirical point of view.

The existing literature. Over the last decade, economists have increasingly addressed themselves to children. The starting point was the new economics of the family, stemming from a seminal article by Gary Becker on household production and the value of time.[1] Economic research in this area took several directions, like explaining the quantity of children, the determinants of child quality, the issue whether children are investment or consumption goods and several other.[2]

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* An early version of this paper was presented at the OECD Conference on Early Childhood on the occasion of the Year of the Child. Unless otherwise mentioned, the statistical information reported here comes from the special OECD country files compiled on the occasion of the Year of the Child. I am indebted to Norberto Bottani for providing me with this information. I would also like to thank Marcelo Selowsky for useful discussions, as well as Mark Blaug, Walter McMahon and Don Sharpe who read a first draft and offered useful comments and suggestions for improvement.

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One particular area of past economic research relating to "children" (broadly defined) is the economics of education. The literature is extremely rich on the extent to which educational expenditures are an investment and what is the social and private profitability of this investment. Yet a scan of Blaug's recent edition of an annotated bibliography in this field reveals that out of the 2000 items listed not much refers to the economics of *pre*-primary education.[3]

The Policy issues. The policy issues regarding the provision of services to young children could be classified into (a) Social efficiency and (b) Opportunity and equity issues.

The first class of issues imply a *resource allocation* question. Is too much or too little currently spent on nursery schools? Should the capacity of crèches be increased in a given country? What is the social profitability of expenditure on daycare facilities?

The second class of issues is addressed to the *private versus social payment* for a given service, e.g. what kind of parent (e.g. rich/poor) uses what kind of facility? Or, how is the full cost of a given social provision for children financed out of the general taxpayers' money and how much by parental contributions?

These questions imply both normative value judgments and positive analysis. Services for children as those described above, entail the use of resources that could be used on something else, say, crime prevention. Given the fact that different sectors in the economy compete for the use of limited resources, how do services for young children compare with other services? Should one aim for a 100 per cent crèche and kindergarten coverage? If not, why and to what percentage?

LOSLA versus ROSLA. One analogy can be drawn by comparing the social welfare effects of ROSLA (Raising of the School Leaving Age) to what we

shall name LOSLA (Lowering of the School entry Age). After World War II many European countries have instituted ROSLA (e.g. England, Portugal and Greece) and we seem to have some knowledge on its economic effects.[4] Extending compulsory schooling backwards, however, is rather novel (cf. discussions in France, the Netherlands and Finland) and no literature exists on the economic effects of LOSLA. Clearly, one cannot extrapolate the effects of ROSLA backwards, because of the age difference involved. In the first-place there must be cost differences between the provision of educational facilities to, say, 7 year olds and 3 year olds. Second, and perhaps more important, there must be differential diffusion effects of the resulting benefits. For example, the early childhood educational benefits might disappear a few years after entry to the compulsory primary cycle, whereas the effects of ROSLA might be lasting over a lifetime.

But let us have a closer look at the costs and benefits related to the provision of early childhood social services.

The cost side. There exist many concepts of what is the "cost"of a social service and some of them are more relevant than others in analysing the economics of activities such as daycare provision and kindergarten.

It should be explicitly stressed that certain Government expenditures on children (such as family allowances) are *not* part of the economic (social resource) cost of the service. These allowances are simply transfers from the rich and those who do not have children to those who have. These allowances do not entail "production" or use of real resources in our society and hence are not relevant to the efficiency discussion. However, they are important as a measure of the weight given by different governments to social welfare and also can influence the desired optimal size of the family.

What really matters is the opportunity (rather than accounting) cost of the service. Whether day care is socially provided (say by a state financed crèche system) or not, babies are already taken care of at home by their mothers. Therefore, the true incremental cost of the social service is that in addition to the existing best alternative, ie. day care at home. It is the comparison between the unit cost of mother's time and the unit cost of a day care centre that can, partially,[5] decide the optimal allocation of daycare resources between the family and external institutions.

The benefits side. It might be useful to classify what the benefits society as a whole expects from the provision of services for children under three, not mutually exclusive, headings: (a) social demand satisfaction, (b) child development, and (c) parental labour force participation.

The demand for kindergarten services might be only due to the fact that parents wish to "consume" such service in the same way as they consume any other service. For example, a housewife might value the extra leisure time made available to her when her children attend nursery school. In such case, the value of the social benefit associated with the provision of kindergartens is equal to the amount of money parents are willing to pay in order to enjoy the service.

However, this consumption view of child facilities is not inconsistent with the investment view, ie. the fact that kindergartens provide additional, long lasting benefits accruing to the child and the mother. Let us examine them in turn.

Child benefits. These can be divided into two major sub-categories. First, early cognitive development and, second, ultimate educational attainment and lifetime earnings.[6]

(i) From family and kindergarten to early ability

In order to assess the first stream of benefits, one must assume the existence of an early ability (A) generating process, say $A = f(F, K)$, where F stands for family background and K stands for kindergarten. Both F and K contribute to the development of A. However, one would like to know the exact algebraic specification of this function in order to answer the important question of the ease of substitution between family and kindergarten exposure to the development of early ability. Clearly, kindergarten exposure is expected to have an A boosting effect on those children coming from low F (say, as measured by the educational level of the mother). But what about those children coming from high F? Is a highly educated mother a better informal teacher regarding the development of early ability, relative to a nursery school teacher? These are important questions that can be answered only by reference to empirical data.

Another crucial consideration in this respect is the comparison between the "family price" and the "kindergarten price"in changing A by a given amount. Social policy on kindergartens must be based on the empirical relationships between the "marginal products" of F and K $(\frac{\partial A}{\partial F}, \frac{\partial A}{\partial K})$, derived from the production function and their cost at the market place (P_f, P_k). The optimal number of kindergarten services is found at point M where the ratios of the marginal products and market prices of F and K are equal to each other.

(ii) From early ability to educational attainment

Early ability is fed as an input to the next stages of development, such as late ability and ultimate educational level completed. To put it formally, early ability is a raw input to the educational production function, $ED = g(A, \text{School inputs})$, where ED can stand either for the ultimate

level of educational attainment or an index of scholastic achievement, and A stands for early ability.

A higher level of previously generated early ability is tantamount to a lower cost of the formal educational process. The raw inputs to this process (say, children at the age of 5) are somehow already formed and make the task of the primary school teacher easier. Also, a higher early A might remove a particular handicap of the child at an early stage and thus enable him or her to attain a higher ED (eg. complete high school instead of dropping out).

(iii) From education to earnings

However, this is not the end of the causation chain. A higher level of educational attainment can lead to a better occupation and hence higher earnings over a life-time. Although one would expect the impact of early ability boosting to diminish as years go by, the possibility exists that kindergartens might have a lifetime lasting effect.

The long chain of causation just described is schematically summarised in figure 1.

Mother's labour force participation benefits. When a mother's time is free because of the provision of a day-care or nursery school place for her child, she can use her free time in two ways: for increased "home production" (ie. shopping around for lower food prices, better quality meals, etc.) or out of home production by participating in the labour force. To the extent that her market wage is higher than the implicit (shadow) home production wage, this difference between the two kinds of "wages" is at the same time a private and a social benefit resulting from the provision of the nursery school place for her child.

However, the stream of benefits to the mother does not end with the end of nursery school. The fact that she has not interrupted her working life means she has accumulated experience, ie. a special form of human capital which will provide benefits over a lifetime.

This discussion is illustrated in figure 2 showing the age-earnings profiles of a working mother whose child has been in day care or attending nursery school, and that for a non-married working female as the control group.[7] The social benefits associated with daycare provision are only those *in excess* of the implicit domestic production value of the non-working mother (area ACDG). Note that the domestic production value (shaded area CDIH) is immaterial for the social cost-benefit calculation. The second part of social benefits comes from investment by training on-the-job (GBFE). The total plus area (after proper discounting, of course) can be compared to the minus area (HIKJ) representing the social cost of daycare facilities, in order to arrive at an overall profitability measure of the service. If the benefits exceed the costs, this is a signal pointing at the desirability of increasing the capacity of crèches or kindergartens.

Evidently, the case presented in figure 2 is highly illustrative. The profiles of married and single females will differ for a host of reasons other than children depending on the particular characteristics of the individual (such as colour, or educational level) and these are considerations that must be taken into account in empirical applications of this framework.

II. SOME ORDERS OF COSTS

After having provided a theoretical taxonomy of issues and relevant items to look at, what follows is an attempt to document the empirical size of some of the variables discussed above. The total amount of resources used for services to children is a first consideration we focus on. But

because of the scarcity of data in this respect we shall approach the issue by means of several steps and we shall also have to make some approximations. One step is to start by examining the coverage of a particular service rather than its cost.

On coverage. Let us start from the provision of kindergarten or pre-primary education. Table 1 shows a rather astonishing differential coverage of nursery schools in OECD member countries. Whereas France has a 100 per cent coverage of the 3-5 years old, the USA covers only 52 per cent, Japan 39 per cent, New Zealand 32 per cent and Norway 13 per cent of the relevant age group. Clearly, part of these wide differences are due to differences in the definition of "pre-primary" education or in the compulsory school starting age. But perhaps the major part is due to a differential philosophy on the pros and cons of nursery education.

If the differences in the level of coverage between countries are not strictly comparable, a more valid comparison can be drawn by reading Table 1 horizontally. Namely countries such as Germany, Norway and Portugal have nearly doubled the 3-5 year old coverage in a six year period, whereas in other countries the participation of young children in pre-compulsory education facilities has shown only modest increases. Evidently, questions arise at this point as to whether this is the result of an intentional educational policy or simply the reflection of social demand? Should countries that appear "low" in this league table attempt to accelerate kindergarten provision? Answers to these questions can result only from a social cost-benefit calculus as that outlined in the previous section.

The provision of day care or crèche facilities. Although the statistical information on this front leaves much to be desired, there exists vast differential availability of places in this respect. For example, crèche

places in Portugal cover only 3.5 per cent of the 0 to 3 population age group. To what extent this figure is "low" or, perhaps, "high", depends upon what one expects from day care provision relative to its cost. The corresponding crèche coverage in Greece is 8.9 per cent, in Spain 10.8 per cent and in Germany 20 per cent. Kindergartens have grown much faster than day nurseries in Japan and also cover a larger portion of the population (40 versus 20 per cent of 3-5 age group, respectively).

The level of expenditure. International statistics are not very forthcoming on social expenditures for children. For example, UNESCO lumps together pre-primary and primary educational expenditures. Also, this expenditure is often an underestimate of its true level because of the many factors involved (e.g., the Central Government, the local authorities and the parents). For example, even if properly recorded, official expenditure statistics in Germany would have missed over three-quarters of the true expenditure on pre-school education.

Instead, on the basis of a variety of individual country sources, it was possible to compile Table 2, showing the expenditure on pre-school education and daycare in a small number of countries as a percentage of the country's total recurrent spending on education. Once more, the differences between the individual countries should not be taken literally because of definitional and statistical reporting discrepancies. Pre-primary and primary education combine, typically, account for one-third to one-quarter of the total education budget. Given the earlier documented fact that enrolment in pre-primary classes is well below 100 per cent in most countries, it is not surprising that the total resources devoted to that level of education is comparatively small. Although necessary, however, this is not a sufficient condition for the observed fact as it also depends upon the average cost per enrolled pupil.

A number of alternative sources give an explicit breakdown of the total educational expenditure by level and confirm the fact that what is spent at the pre-primary level is small relative to the other levels. For example, in Switzerland the ratio of nursery to primary school spending of the Cantons in 1977 was 1:14.

The unit cost structure. As mentioned above, it is the per child cost that matters in assessing the desirability of expansion of services to children. We already have some knowledge on the primary-secondary-higher education unit cost structure. Readily available information on pre-primary unit costs is virtually non-existent. However, different pieces of evidence on participation and expenditure were matched as to arrive at comparative Table 3. The information is again very thin and should be treated with caution. But it all points to one fact: Nursery education is much cheaper than primary education. This is confirmed by an earlier cost analysis in France, Japan and the United Kingdom where the pre-primary to primary unit cost ratio in 1970 was of the order of one third in all countries.[8]

Could the differential cost of pre-primary education documented earlier be due to quality differences between countries as, for example, in the utilisation of teachers? The available evidence points to a negative answer. Student-teacher ratios in pre-school education are of the order of 20 to 30, ie. very similar to those observed at the primary level and do not differ dramatically between countries.

The Public versus Private Finance. One important consideration regarding the cost side, is who pays for it. The proportion of the time cost covered by public funds reflects to a large extent the weight given by the state to pre-school education or daycare provision. Alternatively, the share of cost paid privately is an indication of the importance given by families to the services of pre-school institutions.

Thus, as judged from the enrolment share in Japan, three quarters of kindergarten education is private. However, the private share drops drastically by single age group. In terms of costs, the private share becomes zero at the primary educational level and rises again at the post-compulsory level. Also, the private finance of kindergartens has fallen between 1965 and 1973 as a higher share of the cost is borne by the state.

A similar evolution is observed in Italy where the small state kindergarten sector is growing faster than the private sector. In Denmark there exists an interesting scheme covering the cost of daycare facilities. The capital costs are borne entirely by the state, whereas 35 per cent of the recurrent cost is paid by the parents. In Belgium, parents pay only FB 159 per day towards the FB 935 full cost of a public crèche.

According to Unesco data, the private share in pre-school enrolments ranges from 0 in Yugoslavia to 89 per cent in Portugal. Other Mediterranean countries, like Spain and Turkey exhibit higher private shares, whereas the corresponding figure in Denmark, Iceland and the United Kingdom is below the 10 per cent mark.

III. DOCUMENTING THE BENEFITS

As mentioned in the introductory section, the social benefits associated with expenditure on children could be divided into two parts: those occuring to society via the child and those generated via the working mother. Let us examine some evidence on these two fronts.

Benefits via the child. The psychological literature is rich in results concerning the development of human abilities and general intelligence, and at the same time rich on controversies regarding the significance and reliability of the existing estimates.[9]

From our point of view, the two most crucial questions we are interested in are, first, the relationship between early ability and late ability, and second, the relationship between ability and the later performance of the individual in school and society in general.

(a) The correlation between early and late ability.

It is very unfortunate that the existing estimates mostly refer to IQ testing which reflects only part of the ability of the individual. Given this qualification, the correlation between early and late ability is on the high side.

Thus the zero-order correlation in Jenck's work between early and late IQ is .830.[10] The corresponding correlation in Fägerlind's work is .745.[11] Bloom[12] reports that 50 per cent of the ability level of the individual is built by the age of 4, and that the ability level increases by 60 per cent between the ages of 4 and 6. He also reports a series of correlations between early and late IQ in excess of .450 from other studies. Selowsky[13] reports results where the early to late IQ coefficients are associated with low standard errors.

It should be noted, however, that Averch et al (op.cit., p 132) report evidence that although pre-school intervention has a definite initial impact on ability, after a few years this impact fades away and the IQ of the control group is nearly equal to the IQ of the experimental group.

(b) Early ability and life chances

In my opinion, the best evidence on this front comes from the sociological literature on path analysis. This links together several of the variables in the family-early ability-education-earnings nexus in a neat temporal causal sequence.

Two such examples are chosen, one from the United States and the other from Sweden (figure 3 and 4). The numbers on the arrows are "path coefficients" and their size denotes the relative strength of one variable in affecting the next.[14] The empirical estimates in the two countries are strikingly similar. Thus there exist very strong paths between early and late ability, reflecting the positive correlation reported above. But the simple model is now expanded to include the effect of early ability of the level of educational attainment of the individual. The evidence points to the fact this effect is fairly strong. Also, a high level of education means a better occupation, thus indirectly influencing the level of earnings later in life.

That there exist strong direct and indirect effects between early ability and later life chances is a matter of fact. What is not known, however, is the monetary size of the benefits in order to compare them to the cost of generating this ability. Kindergarten (K) is a missing variable to be placed somewhere between "F" and "A-early" in figures 3 and 4.

Benefits via the mother. The best way of documenting the potential benefits associated with early childhood services via the mother, is evidence on the labour force participation of married females by age. The labour force participation rate of married women dips sharply between the mostly pre-children and children-raising ages of 20-24 and 25-29, respectively. Regardless of differences between the level of female labour force participation rate in various countries, the common feature is a decline of participation by 15 to 50 per cent between the two age groups.[15]

With very few exceptions, the overall trend has been on an increase in the female labour force participation rate between the sixties and the seventies in most countries.

Another related dimension is the parallel increase of the educational attainment of females. The labour force participation rate of women is a sharp positive function of education. The link here must be sought in the high opportunity cost of the more educated woman associated with staying at home. Although the value of home production cannot be overemphasised, the fact that a woman decides to seek paid work in the market means that her money wage is higher than the implicit shadow price of working at home. The provision of childhood services clearly enhances female mobility between the home and the market, thus contributing to the optimal allocation of labour resources in contemporary societies.

To what extent has this rapid increase in the labour force participation rate been due to the parallel development of early childhood services? Or, perhaps, to what extent have early childhood services been developed to cater for the increasingly working mother? Clearly, both forces must have been at work and it is very difficult to separate them empirically.

IV. SOME RESEARCH PRIORITIES

In the above exposition two kinds of pre-school institutions were distinguished depending on the age of the child and whether some form of instruction is provided: crèches (approximate age group 0-3) and kindergartens (3-5). Each type of institution has different costs and yields a different stream of social benefits.

On the basis of very limited information crèches appear to be very expensive relative to other forms of pre-school services. By the same token it is very difficult to arrive at an estimate of the social value of the crèche to the working mother, let alone the substitutability between family and institutional inputs in early child development.

Kindergartens appear to be cheap relative to formal school classes at the elementary level. However, it is very difficult to project their beneficial effect over time because K (=kindergarten) is a missing variable in sociological path analysis. One piece of evidence that can be established with certainty is that the correlation between early and late ability is on the high side, although the "ability" in question often refers to the limited IQ measure.

Pre-school services have drastically increased over the last decade and are mainly financed by private means. Yet Western societies differ drastically regarding the shape of the base of the educational pyramid. Observations as these raise issues of the optimal level of services for children and the finance of the associated cost. One particular policy issue is that of lowering the compulsory education starting age. These issues can be answered only on the basis of an interdisciplinary social calculus that is missing from the literature.

Demography. The starting point of the provision of services for children is demographic. Demography sets the upper bound of the potential population to be served. This is an area where intense new research might not be needed, as population statistics and projections are both abundant and of good quality. At a very aggregate level, the statistics indicate that following the birth decline of the 1960's and early seventies, the population group aged 0-4 will show moderate increases to the end of the century in European countries. However, the composition of the population will steadily grow older.

On a less aggregate basis, there exist considerable differences between individual countries. Thus France, Iceland, Spain and Turkey are expected to experience a rise in the 0-4 population group between 1980 and 1985, whereas countries like Norway and the Netherlands will experience a decline during the same period.

Quantity versus quality. Although demography can supply the numbers of infants and children to be catered for, it says nothing about the quality of institutions to be created. There exist many kinds of crèches and many kinds of kindergartens. For example, there exist crèches with or without professional nursing staff and there exist kindergartens with or without qualified teachers to teach very young children.

Differential quality means differential cost, and it is here that economic considerations become important. But since costs represent only one side of the coin, reference to educational psychology must be made in order to determine whether the extra cost is associated with a benefit of sufficient size to justify the better quality.

Clearly, what is needed is a multi-discrplinary approach to the subject, an activity that, in my opinion, is still in its infancy. What follows is a short list of specific research topics I feel should be urgently tackled in order to increase our understanding in this delicate policy area.

A research agenda

(a) Assessing the true marginal social cost of different kinds of services for children. This can refer to crèches and kindergartens of different quality. Further, it can refer to the provision of nursery school services by the mother at home, a classic case of national accounts statistical neglect.

(b) Monetising the benefits of different kinds of services for children. Again, these benefits can refer to the mother, to the child or society as a whole. One could argue that these benefits should *not* be monetised on grounds of their merit good character. However, I would argue that they should *also* be monetised on grounds of the

existing (and increasing) scrutiny on public expenditure. A case for spending on children can be easier made if the "child sector" competes on equal grounds with other economic sectors where the allocation of funds is made on the basis of economic profitability.

(c) Assessing the substitutability between different child services inputs in generating a desired "outcome". The latter could be of the traditional cognitive type or the socialisation, flexibility, better school-raw-input type. For example, although crèches might liberate the mother for working at cost X, the benefits they provide relative to care at home might be Y, where X > Y. The existing literature on issues as this is carta blanca.

(d) Blending of the costs and benefits. Even if one had reliable information on annual costs and benefits, blending of these two ingredients in order to arrive at an overall cost-benefit ratio would not be easy. The reason is we lack one additional piece of information, namely the *durability* of the investment benefit, for example, will the kindergarten benefit last for one, two, three or perhaps more years after the age of 6 and, if yes, for how many years? If not, what would be its rate of depreciation? Or, perhaps, what would be the rate of its future enhancement due to its combination with further complementary inputs (such as formal schooling after the age of 6)?

(e) Assessing the profitability of LOSLA. If we have *some* information on the economics of *raising* the school leaving age, we have only speculations regarding the social profitability of *lowering* the school *entry* age. Yet if more countries follow the example of France and the Netherlands in advocating compulsory LOSLA reform, the educational policy maker should be more informed about the underlying economics. For if LOSLA is in fact socially profitable, its adoption

should be speeded up and the bill should be paid by the taxpayer. On the other hand, if it proves to be mainly a kind of expensive baby-sitting activity, the financial burden of it should be shifted to the consumer of the service.

The existing statistics show that the latter is the rule (ie. the main source of finance of pre-school education is private) without knowing the social profitability of this activity in the first place.

(f) Examining the gap of development between Day Care Services and Kindergarten. As has been mentioned above the extension of Kindergartens in some countries has been more impressive than the extension of services for children under 3 years old. This pattern of development might reflect certain structures of social demand, but the question should also be asked and explored whether this pattern is justified in economic cost-benefit terms.

(g) An assessment of existing and proposed methods (with costs and effectiveness) of training people to "care" for young children. This topic would cover, for example, an investigation of the level of qualifications which are really required for early education staff, the possibility of very short training periods such as playgroup leader courses or courses for childminders, and an estimate of the "return" which might be gained by offering courses to parents on early child development tactics.

Let us hope that the International Year of the Child would have been the landmark when the economics of early childhood services is taken seriously. It is only this way more informed political decisions could be made in the sphere of pre-school education.

FOOTNOTES

1. G. Becker, "A theory of the allocation of time", *Economic Journal*, September 1965.

2. For a collection of essays in this spirit, see T.W. Schultz, ed., *Economics of the Family*, National Bureau of Economic Research, 1974.

3. See M. Blaug, *Economics of Education: A Selected Annotated Bibliography*, Third Edition, Pergamon Press, 1978.

4. See G. Psacharopoulos, "Economic Implications of Raising the School Leaving Age", *Comparative Economic Review*, February 1978.

5. The other ingredient is, of course, the relative benefits of the two modes of daycare.

6. For a discussion of the complexities in this front see N. Bottani, "The parental role in education: Chairman's introduction" and other papers in Part 3, S. Doxiadis, ed., *The Child in the World of Tomorrow*, Pergamon Press, 1979.

7. The figure can easily be modified to deal with part-time labour force participation. For an attempt to apply a similar framework to Swedish data, see S. Gustafsson, "Cost benefit analysis of early childhood care and education", OECD, CERI, May 1978 (mimeo).

8. Based on OECD, *Educational Expenditure in France, Japan and the United Kingdom*, 1977, p. 50.

9. E.g. see R.E. Snow, "Mental abilities", in *The Encyclopedia of Education*, 1971, A.R. Jensen, "How much can we Boost IQ and Scholastic Achievement"? *Harvard Educational Review*, 1969, D. Eklind and A. Sameroff, "Developmental Psychology", *Annual Review of Psychology*, 1970, J. Kagan, "On class differences and early development", in V.H. Denenberg, ed., *Education of the Infant and Young Child*, Academic Press, 1970, and for a general review, H.A. Averch et.al. *How Effective is Schooling?*, Education Technology Publications, 1974, and M. Smilansky, "Priorities in Education: Pre-School Evidence and Conclusions", World Bank, Staff Paper No. 323, 1979.

10. C. Jencks et.al., *Inequality*, Basic Books, 1972, p. 322.

11. I. Fägerlind, *Forman Education and Adult Earnings*, Almqvist & Wiksell, 1975, p. 58.

12. B.S. Bloom, *Stability and Change in Human Characteristics*, John Wiley, 1964. Some of my colleagues inform me that Bloom's figures have far more controversy surrounding them than concensus.

13. M. Selowsky, "A note on pre-school-age investment in human capital in developing countries", *Economic Development and Cultural Change*, July 1976.

14. The graphs are incomplete in the sense of presenting only the arrows relevant to the present discussion. The "total effect" of one variable onto the next can be worked out only by reference to the original publication.

15. See OECD, *Equal Opportunities for Women*, 1979, p. 129.

TABLE 1. The pre-primary education enrolment ratio in selected countries, 1970 and 1976

(percentage)

Country	Enrolment ratio (Ages 3 to 5)	
	1970	1976
France	87.0	100.0
Germany	40.0	78.5
Italy	62.6	70.1
Japan	23.4	39.3
Netherlands	60.1	68.0
New Zealand	23.5	31.7
Norway	4.5	13.3
Portugal	2.8	7.6
Spain	42.1	45.1
United Kingdom	11.0	14.1
USA	39.8	51.9

Source: Based on OECD Country files.

TABLE 2. The total level of expenditure on children services in selected countries

Country	Year	Expenditure item	Expenditure as per cent of educational budget
New Zealand	1975	Pre-school	1.7
Japan	1974	Pre-school	4.6
Germany	1976	Nursery	3.3
France	1974	Pre-school	4.4
Switzerland	1977	Pre-school	1.6
Norway	1976	Kindergarten	3.8

Source: Based on OECD Country Files and Unesco, *Statistical Yearbook*, various years.

TABLE 3. The average annual cost per place in pre-school institutions

(in $US)

Country	Year	Kindergarten	Crèche
Australia	1978		1565
New Zealand	1978	331	
France	1974	196	
Finland	1979	415	7000
Japan	1978	1577	
	1970	160	
	1974	391	
Switzerland	1977	316	
Portugal	1977		396
Belgium	1976		8400
Denmark (private)[a]	1978	792	1284
(social)[b]	1978	2683	5317
Netherlands	1976	851	
Greece	1979		965
Spain	1979		435

Source: Based on OECD country files.

Notes: a Parents payments.

b State and municipal funding.

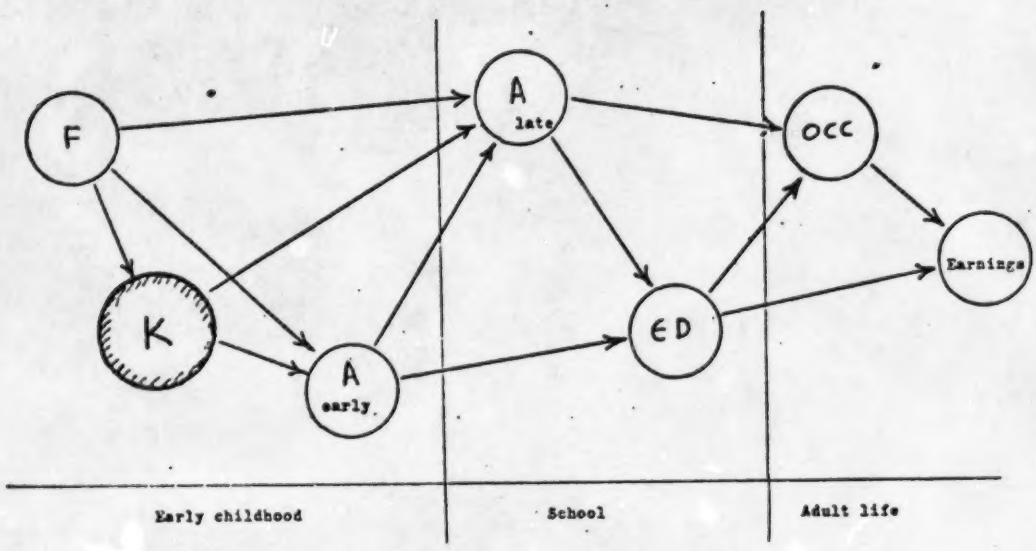

FIGURE 1. From family background to adult earnings

A= Ability
F= Family background
ED= Education
OCC= Occupation
K= Kindergarten

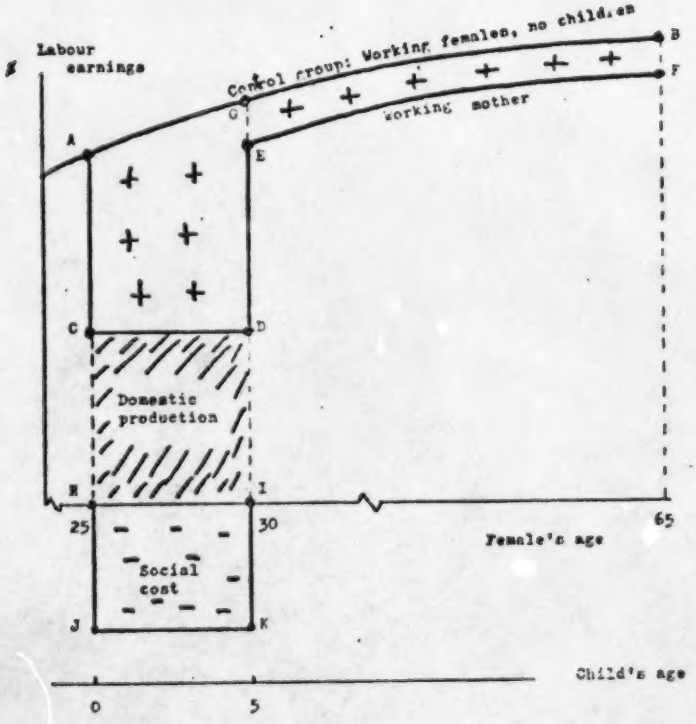

FIGURE 2. Cost-benefit analysis of the provision of daycare.

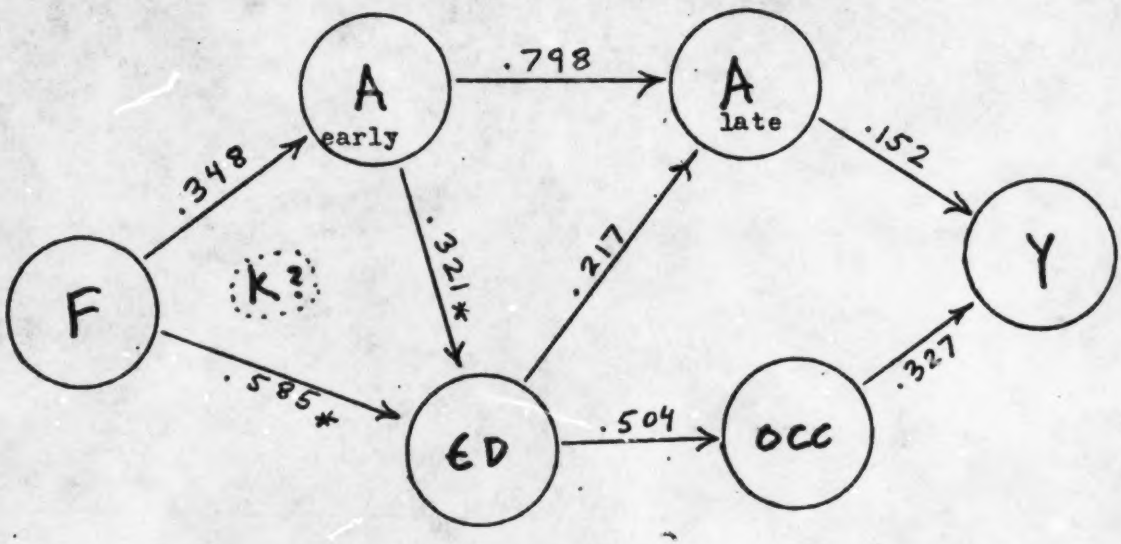

FIGURE 3. The determinants of life chances in the USA.
(Source: Jecks, op. cit, p.346)
* Average of high and low paths

F= Family background
A= Ability
ED= Education
OCC= Occupation
Y= Income
K= Kindergarten

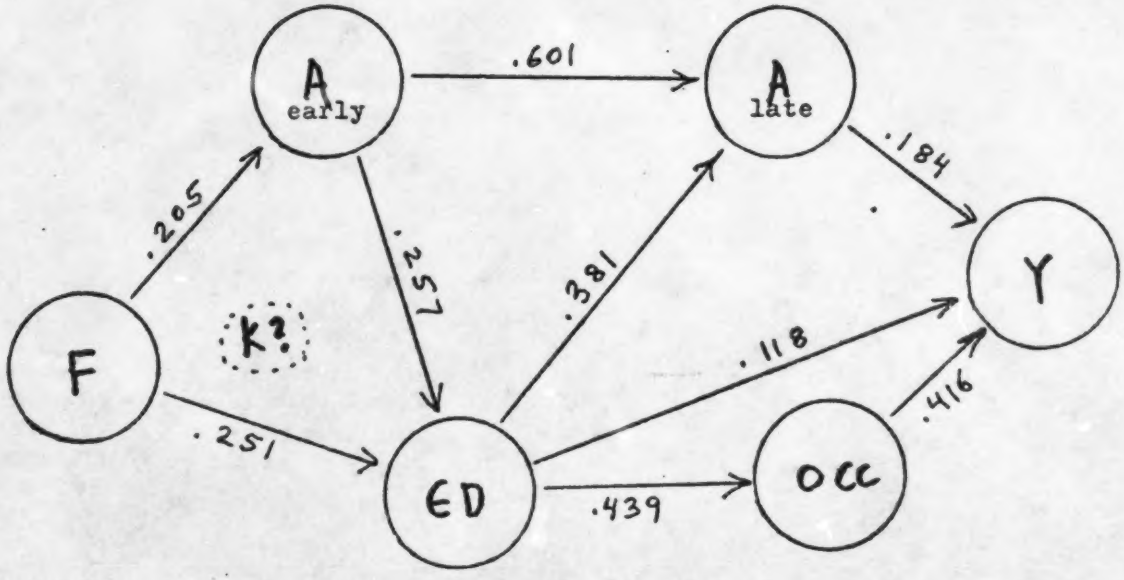

FIGURE 4. The determinants of life chances in Sweden.
(Source: Fägerling, op.cit., p. 65)